transit instrument is set up in front of the object-glass in prolongation of its axis. The object-glass thus becomes a collimator to the transit instrument, through the eyepiece of which the lines of the reticule may be observed as if they were at an infinite distance. It should be remarked, however, that as the reticule is slightly inside the visual focus of the object-glass, it is not generally possible to obtain perfectly distinct vision of its lines and of the wires of the transit at the same time. This difficulty is obviated by marking the intersection of the middle vertical and middle horizontal lines of the reticule in such a distinct manner, that the slight maladjustment of focus does not prevent it from being seen. Then, by means of the transit, the reticule is adjusted so that the point in question is very approximately in the meridian, and at a zenith distance of ninety degrees. Finally, the exact azimuth and zenith distance of the point are measured.

The remainder of Professor Harkness's paper, which will probably be given *in extenso* in the *Memoirs* of the Society, is occupied with a full and detailed explanation, with diagrams, of the principle of the instrument, and of the methods of measurement of the photographs.

Micrometrical Measures of Double Stars. By George Knott. (Abstract).*

I have the honour of presenting to the Royal Astronomical Society a short series of Micrometrical Measures of Double Stars, taken between the years 1860 and 1873, at my former residence, Woodcroft, Cuckfield.

The Observatory, detached at some little distance from the house, and commanding a good horizon view, stood at an elevation above the sea level of about 370 feet, and in the approximate position, latitude $51^\circ\ 0'\ 41''$ North, longitude $0^h\ 0^m\ 34^s$ West.

The Equatoreal has an object-glass of $7\frac{1}{3}$-inches clear aperture and $110\frac{1}{2}$-inches focal length, by Messrs. Alvan Clark and Sons of Boston, U.S.A., and is a fine specimen of the makers' skill. It was formerly in the possession of the Rev. W. R. Dawes.

The filar, or parallel-wire, micrometer, employed in the following measures, was made for me by the late Mr. Dollond. It has a position-circle of $3\frac{1}{2}$-inches diameter, reading, by two verniers, to tenths of a degree, and the angle of position is taken by placing the two stars under observation centrally parallel between two thick wires, about $13''$ apart. At right angles to the position-wires are the webs for distance-measures, of which two, one

* The Paper will probably appear *in extenso* in the *Memoirs* of the Society.—Ed.

fine and the other coarse (the latter for measures of faint objects, but rarely used), are carried by each screw.

The screw-heads, divided to 100 parts, are of nearly two inches diameter, and are fitted with bolts, so that either web may be fixed as zero-wire, while the other is used in making the measures. There is a battery of seven eye-pieces, with magnifying powers from 115 to 515, and, by the use of an achromatic concave Barlow-lens, the magnifying power may be increased in the proportion of about 2·25 to 1. The micrometer is also fitted with a convenient slipping-piece. The value of one revolution of the screw is 18″·2949, and with the Barlow-lens, 8″·0765.

In reducing the observations, the arithmetical mean is taken as the mean for the night. To each individual measure a number is assigned (1–9) expressive of its estimated worth, and the sum of these numbers is taken as the weight of the set, which is thus a function of the number of observations and of the estimated value of each measure. In forming the "Mean results" (or mean of several nights' measures), this number is introduced as the *combination weight.*

Being interested in the observation of Variable Stars, I found it convenient to adopt Mr. Pogson's standard scale, or Argelander's scale extended to the lower magnitudes by the adopted light-ratio 2·512. (*Monthly Notices*, vol. xvii. p. 15.) The numbers expressing the magnitudes will be found therefore to lie generally between those of Σ on the one hand, and that of H. and Sm. on the other, the difference being more marked in the lower magnitudes. Although, for convenience, the magnitudes are expressed decimally, they must not be regarded as making any pretensions to very close accuracy.

Cuckfield,
1877, *January* 11.

On the Orbit of α Centauri. By J. R. Hind.

Having been lately favoured by Lord Lindsay with the results of two sets of measures of the angle of position of *α Centauri* made with the heliometer at the Mauritius in November 1874, during his Lordship's expedition for the observation of the transit of *Venus*, I have attempted a further approximation to the elements of this most interesting binary.

I employed the last orbit by Mr. Eyre B. Powell, of Madras, in the formation of equations of condition, for the epochs of the most reliable mean results, depending on the measures of Sir John Herschel, Captain Jacob, Mr. Powell, and Lord Lindsay, at the same time admitting the angle for 1752·2 given by Lacaille's Right